



Displaying title 40, up to date as of 3/16/2022. Title 40 was last amended 3/16/2022.

**Title 40 - Protection of Environment**  
**Chapter I - Environmental Protection Agency**  
**Subchapter F - Radiation Protection Programs**

---

**ENHANCED CONTENT - TABLE OF CONTENTS**

<b>Part 190</b>	Environmental Radiation Protection Standards for Nuclear Power Operations	190.01 – 190.12
<b>Subpart A</b>	General Provisions	190.01 – 190.02
<b>§ 190.01</b>	Applicability.	
<b>§ 190.02</b>	Definitions.	
<b>Subpart B</b>	Environmental Standards for the Uranium Fuel Cycle	190.10 – 190.12
<b>§ 190.10</b>	Standards for normal operations.	
<b>§ 190.11</b>	Variances for unusual operations.	
<b>§ 190.12</b>	Effective date.	

---

**PART 190 - ENVIRONMENTAL RADIATION PROTECTION  
STANDARDS FOR NUCLEAR POWER OPERATIONS**

**Authority:** Atomic Energy Act of 1954, as amended; Reorganization Plan No. 3, of 1970.

**Source:** 42 FR 2860, Jan. 13, 1977, unless otherwise noted.

**Subpart A - General Provisions**

**§ 190.01 Applicability.**

The provisions of this part apply to radiation doses received by members of the public in the general environment and to radioactive materials introduced into the general environment as the result of operations which are part of a nuclear fuel cycle.

**§ 190.02 Definitions.**

- (a) **Nuclear fuel cycle** means the operations defined to be associated with the production of electrical power for public use by any fuel cycle through utilization of nuclear energy.
- (b) **Uranium fuel cycle** means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel, to the extent that these directly support the production of electrical power for public use utilizing nuclear energy, but excludes mining operations, operations at waste disposal sites, transportation of any radioactive material in support of these operations, and the reuse of recovered non-uranium special nuclear and by-product materials from the cycle.
- (c) **General environment** means the total terrestrial, atmospheric and aquatic environments outside sites upon which any operation which is part of a nuclear fuel cycle is conducted.

- (d) **Site** means the area contained within the boundary of a location under the control of persons possessing or using radioactive material on which is conducted one or more operations covered by this part.
- (e) **Radiation** means any or all of the following: Alpha, beta, gamma, or X-rays; neutrons; and high-energy electrons, protons, or other atomic particles; but not sound or radio waves, nor visible, infrared, or ultraviolet light.
- (f) **Radioactive material** means any material which spontaneously emits radiation.
- (g) **Curie (Ci)** means that quantity of radioactive material producing 37 billion nuclear transformations per second. (One millicurie (mCi) = 0.001 Ci.)
- (h) **Dose equivalent** means the product of absorbed dose and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its spatial distribution in the body. The unit of dose equivalent is the "rem." (One millirem (mrem)= 0.001 rem.)
- (i) **Organ** means any human organ exclusive of the dermis, the epidermis, or the cornea.
- (j) **Gigawatt-year** refers to the quantity of electrical energy produced at the busbar of a generating station. A gigawatt is equal to one billion watts. A gigawatt-year is equivalent to the amount of energy output represented by an average electric power level of one gigawatt sustained for one year.
- (k) **Member of the public** means any individual that can receive a radiation dose in the general environment, whether he may or may not also be exposed to radiation in an occupation associated with a nuclear fuel cycle. However, an individual is not considered a member of the public during any period in which he is engaged in carrying out any operation which is part of a nuclear fuel cycle.
- (l) **Regulatory agency** means the government agency responsible for issuing regulations governing the use of sources of radiation or radioactive materials or emissions therefrom and carrying out inspection and enforcement activities to assure compliance with such regulations.

## **Subpart B - Environmental Standards for the Uranium Fuel Cycle**

### **§ 190.10 Standards for normal operations.**

Operations covered by this subpart shall be conducted in such a manner as to provide reasonable assurance that:

- (a) The annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations.
- (b) The total quantity of radioactive materials entering the general environment from the entire uranium fuel cycle, per gigawatt-year of electrical energy produced by the fuel cycle, contains less than 50,000 curies of krypton-85, 5 millicuries of iodine-129, and 0.5 millicuries combined of plutonium-239 and other alpha-emitting transuranic radionuclides with half-lives greater than one year.

### **§ 190.11 Variances for unusual operations.**

The standards specified in § 190.10 may be exceeded if:

- (a) The regulatory agency has granted a variance based upon its determination that a temporary and unusual operating condition exists and continued operation is in the public interest, and
- (b) Information is promptly made a matter of public record delineating the nature of unusual operating conditions, the degree to which this operation is expected to result in levels in excess of the standards, the basis of the variance, and the schedule for achieving conformance with the standards.

**§ 190.12 Effective date.**

- (a) The standards in § 190.10(a) shall be effective December 1, 1979, except that for doses arising from operations associated with the milling of uranium ore the effective date shall be December 1, 1980.
- (b) The standards in § 190.10(b) shall be effective December 1, 1979, except that the standards for krypton-85 and iodine-129 shall be effective January 1, 1983, for any such radioactive materials generated by the fission process after these dates.